Game playing device

The present invention relates to game playing devices; in particular, but not exclusively, the invention relates to a game playing device susceptible to receiving at least part of its input by optically scanning printed graphical information. Moreover, the invention also relates to methods of operating such devices.

Portable electronic game playing devices are well known. Such devices are often susceptible to domestic use and each includes an outer plastics material casing housing an electronic unit coupled to a source of power, to a visual display and to a user interface. The source of power is conveniently a disposable battery. Moreover, the visual display is conveniently one or more of light emitting diodes, liquid crystal displays and incandescent lamps. Furthermore, the user interface is conveniently one or more switches accessible at one or more exterior surfaces of the casing. Additionally, for example to reduce manufacturing cost, the electronic unit conventionally includes at least one integrated circuit.

For example, in a published United Kingdom patent application no. GB 2, 231, 701, there is described a hand-held electronic game-playing apparatus. The apparatus comprises a casing supporting liquid crystal display devices, and control buttons connected to an internal control circuit operating on a predetermine program. The casing also supports a card reader for reading data encoded onto a magnetic card strip inserted into the reader, and optionally also writing to the strip. A battery holder is built into the casing to accommodate batteries for powering the apparatus. In operation, game data is read from the card strip to the internal control circuit to present to a user of the apparatus via the control buttons and the display devices a preferred game, for example a simulation of a conventional fruit-machine game. Any game winnings are susceptible to being recorded onto the card strip, for example for purposes of subsequent payment of winnings in response to the user presenting or sending the card strip to an appropriate payment establishment.

Moreover, in a published German patent no. DE19923066, there is described an electronic crossword apparatus for solving crossword puzzles. The apparatus includes a housing provided with a microcontroller, a visual display and a plurality of spherical sensors.

The spherical sensors are provided with letter markings thereon and are thereby susceptible for use in alphabetical data entry into the microcontroller. Moreover, the spatial distribution of the sensors is operable to provide a spatial display of letters akin to a conventional crossword puzzle. The visual display is operable to present to a user of the apparatus one or more clue words for prompting the user to rotate one or more of the sensors in response.

Furthermore, in a published international PCT patent application no. PCT/DE01/04776, there is described a computer device for playing games, in particular for the interaction of games figures susceptible to adopting a variable development state. The device is operable to read game status data for controlling its function from device-detachable self-contained electronic memory units, thereby rendering the device capable of playing different games by substituting different electronic memory units.

Recently, Nintendo Inc. has reported that it will shortly be releasing for sale a portable electronic games device including an optical scanner for use in optically reading customized playing cards comprising a printed dot-matrix strip including up to 4 kBytes of data. The game device further includes within its housing an image display together with user operable controls and switches. Moreover, the housing further incorporates associated electronic circuits and a source of power, for example a disposable battery.

The inventors have appreciated that games devices known in the art present one or more problems in use, for example they are at least one too inflexible to play a wide variety of games, and not rendered readily compatible with conventional generally-available media used for public information exchange, in particular printed newspapers, printed magazines and related paper-based products. In devising the present invention, the inventors have attempted to at least partially address these one or more problems.

A first object of the invention is to provide a game playing device capable of accepting input information in the form of paper printed graphical information, for example printed ink bar codes.

A second object of the invention is to provide a versatile game playing device providing enhanced facilities and/or increased ease of use in comparison to known contemporary game playing devices.

According to a first aspect of the present invention, there is provided a .game playing device for receiving input data by scanning graphical information, the device comprising:

(a) scanning means for transducing said input data from said graphical information;

(b) computing means coupled to the scanning means for receiving therefrom said input data comprising one or more of input parameters, software and solution parameters for controlling software execution within the computing means;

(c) displaying means coupled to the computing means for presenting graphical output information from the computing means to one or more users of the device;

(d) user interfacing means coupled to the computing means for receiving user input information and conveying said information to the computing means for controlling operation of the computing means,

wherein the computing means is operable to execute at least one of software pre-loaded thereinto or software subsequently loaded thereinto to drive the displaying means, said software functioning in response to input information and/or parameters input to the computing means from at least one of the scanning means and the user interfacing means.

The invention is of advantage in that it is capable of addressing at least one of the objects of the invention.

Preferably, the device includes network interfacing means for communicating with at least one of other game playing devices compatible with the device and the Internet. Such network interfacing means is susceptible to increasing a range of games that the device is capable of accommodating.

Preferably, in the device, the displaying means includes at least one of: one or more light emitting diodes (LEDs), one or more incandescent filament lamps, one or more liquid crystal displays (LCDs) and an interface for presenting information onto a television-type apparatus.

Preferably, in the device, the interfacing means includes one or more of the following for entering data from one or more users to the computing means: one or more membrane switches, silicone conductive-material switches, conventional push-button switches, conductive pad switches, capacitance controlled switches, one or more stylus-type transducers.

Preferably, in the device, the interfacing means is susceptible to receiving information from television-type remote controls. Such compatibility is of advantage in that it is susceptible to simplifying use of the device, rendering it less expensive to manufacture and/or increasing it acceptability to users already in possession of television-type facilities.

Preferably, in the device, the network interfacing means is arranged to support wireless communication, for example proprietary Blue-Tooth and/or mobile telephony.

Preferably, in the device, the scanning means includes at least one of: a 1-dimensional array of photodetectors, a 2-dimemsional array of photodetectors, an optically-sensitive charge-coupled-device (CCD), an complementary metal oxide semiconductor (CMOS) imaging device, a magnetic scanning device and an imaging scanning device. More preferably, in order to render the device yet easier to use with printed visual material, for example bar codes, the scanning means further comprises synchronization marker sensing means for assisting the scanning means to temporally synchronize to moving visual data presented thereto.

More preferably, the scanning means is capable of reading and conveying visual and/or magnetic information presented thereto to the computing means, said information comprising at least one of:

(a) executable software;

(b) software operating parameters including at least one of: game configuration data, game difficulty parameters, game speed parameters, game character parameters, game layout parameters, device configuration data;

(c) one or more of: answers and solutions to one or more pre-programmed games and software games input to the device via its scanning means; and

(d) one or more Internet URLs.

According to a second aspect of the present invention, there is provided a method of operating a game playing device for receiving input data by scanning graphical information, the device comprising:

(a) scanning means for transducing said input data from said graphical information;

(b) computing means coupled to the scanning means for receiving therefrom said input data comprising one or more of input parameters, software and solution parameters for controlling software execution within the computing means;

(c) displaying means coupled to the computing means for presenting graphical output information from the computing means to one or more users of the device;

(d) user interfacing means coupled to the computing means for receiving user input information and conveying said information to the computing means for controlling operation of the computing means,

the method including the steps of:

(e) executing at least one of software pre-loaded or software subsequently loaded into the computing means; and

(f) arranging for the computing means to drive the displaying means, said software functioning in response to input information and/or parameters input to the computing means from at least one of the scanning means and the user interfacing means.

Preferably, the method includes the step of arranging for the device to interface with one or more of other game playing devices and the Internet connected thereto so as to provide for interactive game playing between a plurality of users.

Preferably, the method includes the step of arranging for the scanning means to be capable of reading and conveying visual and/or magnetic information presented thereto to the computing means, said information comprising at least one of:

(a) executable software;

(b) software operating parameters including at least one of: game configuration data, game difficulty parameters, game speed parameters, game character parameters, game layout parameters, device configuration data; and

(c) one or more of: answers and solutions to one or more pre-programmed games and software games input to the device (10) via its scanning means (30).

It will be appreciated that features of the invention are susceptible to being combined in any combination without departing from the scope of the invention.

Embodiments of the invention will now be described, by way of example only, with reference to the following drawings wherein:

Figure 1 is a schematic of an embodiment of a game playing device according to the invention; and

Figure 2 is a schematic diagram of the device of Figure 1 configured in a communication network configuration with other game playing devices.

Referring to Figure 1, there is shown a game playing device according to the invention indicated generally by 10 and included within a dashed line 20. The device 10 includes an exterior casing (not shown) fabricated from injection-molded plastics material, for example preferably ABS and/or glass-filled nylon. The casing is arranged to house one or more electronic circuits 30 (ELECTRONIC CCTS.), a user display 40 (USER DISPLAY), an optical reader 50 (OPT. READER), a user interface 60 (USER INTERFACE), a power source (PSU) 70 and a device networking interface 80 (NETWORK INTERFACE) for bi-

directionally interfacing with other devices indicated generally by 100 compatible with and/or similar to the device 10.

The user display 40 comprises at least one of a liquid crystal matrix display (LCD), one or more light emitting diodes (LEDs), and one or more incandescent filament lamps although other types of light emitting display are also optionally included. Moreover, the display 40 is user viewable through an aperture and/or substantially transparent viewing window provided in the aforementioned exterior casing. The power source 70 is one or more of a disposable battery, a rechargeable battery and a mains power supply; the source 70 and its component parts are also preferably included within the aforementioned casing.

The user interface 60 is implemented as user-operable controls and is preferably implemented as at least one of: membrane switches, silicone conductive-material switches, conventional push-button switches, conductive pad switches where finger tissue provides a conductive path, capacitance-controlled switches where change in capacitance caused by finger proximity causing state switching, although other types of switch technology are alternatively or additionally employed. For example, the interface 60 is optionally configurable to include also a stylus-type transducer so that a user of the device is susceptible to inputting data to the device 10 in a manner akin to writing with a pen or biro onto paper or card.

The electronic circuits 30 are preferably implemented as one or more integrated circuits mounted on one or more printed circuit boards. Such one or more circuit boards are preferably mechanically rigidly supported within the housing. Moreover, one or more of the user interface 60, the optical reader 50, the user display 40, the power supply unit 70 and the interface 80 are preferably mounted onto the printed circuit board.

The interface 80 is susceptible to being implemented by proprietary Blue-Tooth radio communication technology operating at a communication frequency in the order of 1.5 GHz. Alternatively or additionally, the interface 80 is susceptible to being implemented by one or more of infra-red line-of-site communication and ultrasonic communication, for example using piezoelectric transducers operating in an acoustic carrier-frequency range of 15 kHz to 60 kHz.

The optical reader 50 is one or more of a bar-code reader and a 2-dimensional image reader. It is preferably implemented using one or more of a 1-dimensional array of photodetectors and a 2-dimenisonal array of photodetectors, for example using a proprietary 1-dimensional and/or 2-dimensional optical charge-coupled-device CCD or CMOS imaging integrated circuit. Such imaging circuits are conventionally employed in inexpensive Web

cameras, in low-resolution inexpensive digital cameras and mobile telephones with user-imaging facilities. The optical reader 50 is preferably mounted on the aforementioned printed circuit board accommodating the electronic circuits 30. Alternatively, the reader 50 is mounted on the housing and coupled in communication with the electronic circuits, for example by way of Kapton flexible circuit board connection strips. Moreover, if required to read, for example, printed feature cards 150 including program and/or parameter data in graphical printed form 160, the game playing device 10 is also provided with a motor drive assembly (not shown in Figure 1) for propelling such printed feature cards 250 at a predictable predetermined rate past the reader 50. Yet alternatively or additionally, such printed cards 150 preferably include timing features, for example a linear track of dashes for data synchronization purposes, so that the reader 50 is susceptible to being implemented as a printed swipe card 150 reader and/or a swiped bar-code reader.

The reader 50 is optionally supplemented with or substituted by a magnetic strip reader for scanning magnetically cards and similar types of objects for magnetically recorded data thereon.

As shown in Figure 1,the interface 60, the reader 50, the display 40, the interface 80 and the power source 70 are all coupled to the electronic circuits 30.

Data input from the card 150 corresponding to the features 160 included thereon are susceptible to including at least one of:

(a) executable software;

(b) software operating parameters; such parameters preferably include one or more of game configuration data identifying one or more pre-programmed games to be played, game difficulty, game speed, game characters to be presented on the display 40, game layout (for example shape of a cross-word puzzle blanked-out spaces), and device configuration data (for example for enabling the interface 80 to communicate with one or more of the other devices 100);

(c) one or more of answers and solutions to one or more pre-programmed games and software games input to the device 10 via its reader 50.

Inclusion of the interface 80 is potentially beneficial when the device 10 is employed for competitive group game playing activities such as Backgammon, Diplomacy, Whist, Snap, Chess, Draughts and such like.

The reader 50 is also optionally susceptible, either alternatively or additionally, to accepting electronic integrated circuit modules including at least one of configuration data, software, software parameter data, Internet and game results data

Operation of the device 10 will now be described in overview with reference to Figure 1.

In a first step, a user places the game playing device 10 on, for example, his/her hand, on an upper surface of a table or desk, or on his/her lap.

In a second step, the user then proceeds to activate the device 10, for example by depressing one or more buttons or switches on the user interface 60.

In a third step, the user then selects to scan one or more items of input information, for example a bar-code like feature printed in a magazine or newspaper.

In a fourth step, the user moves the one or more items of input information spatially relative to the reader 50 so as to load one or more of software, configuration data and solution data to the electronic circuits 30.

In a fifth step, the user finally proceeds to instruct the device 10 via its user interface 60 to execute one or more of the software just loaded into the electronic circuits 30, execute software pre-loaded into the device 10 using configuration data just loaded into the device 10. Where appropriate, the device 10 is also susceptible to presenting solution data via the user display 40 to the user, such presentation being especially appropriate when the device 10 is employed for educational purposes with young children where the device 10 is utilized as an educational toy in venues such as kindergarten and child nurseries.

The device 10 is susceptible to being used as part of a network configuration as illustrated in Figure 2. At least one of the other devices 100 is preferably susceptible of providing a communication link to the Internet. In such a configuration, data input via the reader 50 is beneficially a URL ("Universal Resource Locator"), for example the URL is susceptible to enabling connection to an Internet web-site where answer data, playing parameter data and other types of data are present.

The interface 80 enables the user of the device 10 and the one or more users of the other devices 100 to play games as a networked activity, for example based upon software pre-load and/or subsequently loaded into one or more of the devices 10, 100. The other devices 100 are susceptible to being directly coupled to the device 10, for example as illustrated within a dotted line 105, and/or indirectly coupled, for example illustrated for a remote device 110 indirectly coupled through one of the devices 100 within a dotted line 115 to the device 10. Where the device 110 is an Internet connection, it is susceptible to providing Internet support to one or more of the other devices 100 as well as to the device 10.

Preferably, the user interface 60 is adapted to accept input information from standard proprietary remote controls as often employed to remotely control items of domestic

equipment such as television and such like. If required, the networking interface 80 is susceptible to including a video output suitable for outputting to standard video apparatus such as domestic televisions for presenting the user with larger-scale video information, for example a relatively larger image of a cross-word puzzle where the user is poorly sighted and/or where a complete family of people collaborate to solve a crossword thereby presented.

It will appreciated that modification are susceptible to being made to one or more embodiments of the invention described in the foregoing without departing from the scope of the invention.

In the foregoing, expressions such as "include", "contain", "comprise", "have" and "incorporate" are intended to be construed to be non-exclusive, namely that other items not explicitly listed or mentioned are also susceptible to being present. Similarly, reference to the singular, for example in the appended Claims, is also to be construed to include the corresponding plural.